Crop Production News

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CROPS AGRICULTURE

EDITOR'S COMMENTS

by Brian Olson, AAg
Integrated Pest Management Agrologist

This edition of the Crop Production News discusses a number of hot topics, including several timely disease and insect issues. Saskatchewan Agriculture conducts annual pest surveys to expand our knowledge of current disease and insect issues, as well as provide data for forecasting and prioritizing research.

The Pea Leaf Weevil Survey is complete in southwestern Saskatchewan and the Saskatchewan Bertha Armyworm Monitoring Program is underway. The first Bertha armyworm map of the season will soon be available. Co-operators, please remember to forward your land locations and weekly counts to Brian Olson at 1-888-323-7842 or brian.olson@gov.sk.ca.

Disease surveys will take place throughout July and August. Volunteers are needed for clubroot testing as part of the canola disease survey. Contact Sean Miller at 306-787-4670 or sean.miller@gov.sk.ca for information.

Refer to the Crop Report for an update on provincial crop progress each week.

Crop Production News is a bi-weekly publication prepared primarily by provincial specialists with the Crops and Irrigation and Regional Services branches of the Saskatchewan Ministry of Agriculture. It is a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

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Government of Saskatchewan
Ministry of Agriculture

Chickpea Management

by Sean Miller, PAg
Provincial Specialist, Plant Disease

Ascochyta blight is a devastating disease that can cause yield losses in excess of 70 per cent if left uncontrolled. Even with recent agronomic advances and improved varieties, it remains the most limiting factor in chickpea production.

Ascochyta lesion on a chickpea stem.
Photo courtesy of the University of Saskatchewan

Managing ascochyta blight in chickpeas can be achieved by following a few important guidelines. Ascochyta blight infections from previous years leave disease on the crop residue, resulting in inoculum potential and early infection in the next chickpea crop. Research has shown that disease inoculum is present in the environment as early as the beginning of May, most likely in the form of wind-borne ascospores released from previous chickpea crop residue. Early infections produce conidia, which are spores that spread through rain splash.

If environmental conditions are conducive for disease development, a preventative foliar fungicide may be applied as soon as the crop is at the seven- to 10-node stage. If the weather is dry, it may be possible to delay this application. It is important to protect chickpea flowers in order to conserve the yield; therefore, the next application(s) should occur before flowering.

Foliar fungicides are a very effective tool to manage ascochyta blight, but multiple applications are usually required and fungicide resistance may develop as a result of the repeated use of fungicides belonging to the same chemistry family. Therefore, follow a rotation of products with different active ingredients and tank-mix products from different fungicide groups where registered. Refer to The 2013 Saskatchewan Guide to Crop Protection for registered products.

Scout crops for early signs of disease and follow up after spraying to gauge the effectiveness of your fungicide applications. Intervention with fungicides will limit disease development if the timing is optimized through proper scouting. Early symptoms are the most difficult to identify but are also the most important.

Ascochyta lesions on a chickpea leaflet.
Photo courtesy of Agriculture and Agri-Food Canada.

With multiple applications, eventually the decision has to be made when to stop spraying. Consider the stage of the crop, disease severity and crop health, as well as the value of the crop and the cumulative cost of the fungicide applications. Because *A. rabiei* has a high risk of insensitivity to

strobilurins, use a product with a different active ingredient as the last application of the season.

For more information, visit www.agriculture.gov.sk.ca/chickpea-ascochyta or contact the Agriculture Knowledge Centre at 1-866-457-2377.

In-Crop Mechanical Weed Control

by Chantal Jacobs, BSA, MSc, PAg
Provincial Specialist, Alternative Cropping Systems

Mechanical weed control may be an important operation in organic and low-input farming systems, and may also provide alternative in-crop weed control options for conventional farms affected by herbicide-tolerant, small-seed broadleaf weeds. At this time of year, farmers have made key decisions on crop rotations, seed selection, seeding rates and pre-seeding tillage. For some growers, the question now is: when and if they should use post-emergence tillage to manage weeds.

Selectivity is defined as the ratio between weed control and crop injury, and pre-emergence tillage selectivity is high compared to post-emergence operations. As most weed seeds emerge from the top two centimetres of soil, significant weed control can be achieved by using tillage between seeding and crop emergence, especially with large-seed crops (cereals and pulses) that have been seeded deep. Research has shown that pre-emergence use of a rod-weeder is very effective at controlling weeds in field peas. Field peas and lentils have underground nodes that allow re-growth if tillage damages the hypocotyl and the cereal crop's mesocotyl remains relatively close to the seed (compared to wild oats), which helps protect the apical meristem from mechanical injury. Evaluate crop germination carefully and choose a day with sunny, dry conditions in order to get the best results with pre-emergence tillage operations.

Post-emergence weed control operations have lower selectivity, and it is important to consider the affect that different tillage implements will have at varying crop and weed stages. The most commonly used in-crop tillage implement in organic production is the harrow (tine and flex-tine), and recent research on the rotary hoe has demonstrated its effectiveness in both organic and conventional pulse production systems.

Minimum-tillage rotary hoe.
Photo courtesy of Saskatchewan Agriculture archives.

Harrow type (tine, rotary or flex-tine) has minimal effect on selectivity; however, crop and weed stage, tine angle setting, implement speed and post-harrowing weather conditions all effect crop recovery and final yield significantly. Aggressive tine angle settings increase crop burial and decrease selectivity. To reduce crop injury while maintaining weed control, it is recommended to set the tine angle at around 45°. In past years, it has not been recommended to use tine harrows in oat; however, recent research has shown that oat is as tolerant to tine harrowing as wheat or barley. Refer to Tables 1 and 2 for factors that will improve harrowing success and the recommended crop stages for in-crop harrowing, respectively.

Table 1: Factors affecting in-crop harrowing crop recovery.

Factors Improving Success	Factors Reducing Success
Harrow less than 2" deep	Large amounts of residue
Dry soil (drought conditions negatively affect crop recovery)	Compacted soil
High seeding rates and crop seeded deep	Weeds emerging from greater soil depths
Optimum growing conditions post-harrowing	Poor growing conditions post-harrowing

Table 2: Crop staging recommendations for post-emergence harrowing.

Crop	Harrowing Stage
Cereals – wheat, barley and oat	2 to 4 leaf
Pulses – lentil and field pea	Seedling to less than 4" tall
Oilseeds – flax, canola and mustard	Not recommended

The minimum tillage rotary hoe has a potential fit in both organic and no-till, conventional systems. In recent research, field peas and lentils demonstrated the ability to tolerate rotary hoeing at ground-crack, five-node, eight-node and 11-node stages of the crop, with the greatest reduction in weed biomass in field peas after two to three passes of the rotary hoe at the ground-crack stage. The min-till rotary hoe is most effective at controlling small broadleaf weeds in the cotyledon stage (white-thread), and research demonstrated that rotary hoeing had a higher impact on crop yield and weed biomass when wild mustard and green foxtail were the predominant weeds compared to wild oat.

Pre- and post-emergence rotary hoeing may provide a broadleaf weed control option in organic systems. In conventional pulse production, it may provide an option for controlling herbicide-resistant broadleaf weeds such as kochia, wild mustard and cleavers. Dr. Steve Shirtliffe of the University of Saskatchewan has prepared this video of the the min-till rotary hoe in action.

Spring Weed Control Update

by Clark Brenzil, PAg
Provincial Specialist, Weed Control

The spring of 2013 has had its unique challenges and weed control is no exception. The season's late start in many locations of the province saw many producers chose to seed directly into fields without conducting a pre-seed burn-off. Soil temperatures warmed quickly, however, and the opportunity for a non-selective treatment after seeding but prior to emergence disappeared quickly.

Now these producers may find themselves in a position where they have crops emerging with large weeds that have gone uncontrolled. Many of these weeds will be winter annuals or dandelions. Control of many of these large weeds with in-crop herbicide applications is not always feasible, and producers may have to do their best and move forward.

To improve the odds of managing these weeds successfully, producers can take the following steps:

- Choose systemic herbicides over contact herbicides where possible. Contact herbicides will simply kill the surface tissues with which they come in contact, and the large plant will recover quickly from lateral buds using root reserves. Systemic herbicides, however, even if they do not provide complete control of the weed will usually suspend weed growth for a short period that may be

sufficient to allow the crop to get ahead of the weed.

- Apply herbicide as soon after crop emergence as the product label will allow. The majority of crop yield loss to weeds occurs within the period from emergence to the four-leaf stage of most crops. Weeds emerging prior to the crop have the greatest impact on crop yield, while weeds emerging after crop emergence have progressively less impact the greater the time between the emergence of crop and weed. Keep in mind that many herbicides have a minimum leaf staging, before which applications may cause injury and yield loss.
- Use the maximum rate registered for the herbicide, but do not exceed the label rate. Applying rates greater than label recommendations not only endangers crop health but markets as well. Monsanto has recently released data showing that applications of glyphosate in excess of the label maximums resulted in an average 6.4 per cent yield loss without visible injury symptoms, and up to 33 per cent in extreme cases. In general, rates in excess of the label specifications also increase the risk of excessive pesticide residue in the grain, which can threaten market acceptability and, in the long term, risk damage to the reputation of Saskatchewan as a producer of safe, high-quality grains.
- Avoid water sources that will cause herbicide antagonism. The best source of water is collected rainwater, whether from a cistern, dugout, slough or river. If drawing water from a river, be sure to locate sprayers and trucks used to transport pesticides well back from the water's edge. The ideal system is one in which a tank mounted to a truck or trailer is used exclusively for hauling clean water from the source to the field. "Wild" water sources will be more prone to algae growth in shuttle tanks, so minimize the time water spends in shuttle tanks and disinfect tanks occasionally.
- Improve carrier contact with the target plants with maximum water volumes. Larger weeds have a greater potential to shade each other and smaller weeds growing below them. Increasing water volumes can increase the odds of every plant being exposed to the herbicide.

In the end, producers may have to accept that larger weeds will not be controlled this season.

With the high moisture conditions of the last few years, there have been an increasing number of calls to the Ministry regarding weeds with a preference for wet conditions. Requests for controls for horsetails and cattails seem to be more frequent than normal in 2013.

Horsetails (field horsetail and scouring rush) reproduce sexually by spores rather than seeds, and flooded fields and high water tables favour their establishment. Once established, the plant spreads vegetatively, forming large colonies where all plants are interconnected and genetically identical. There are limited control options for horsetails since much of the mass of the plant is found underground and uptake of many herbicides is restricted by the high silica content of the horsetail tissues. Glyphosate and phenoxys (2,4-D and MCPA) are largely ineffective. Amitrol 240, one of the few herbicides providing more than top-growth control, is labeled for control of horsetail but rates are very high, making the application costly over a large area and leaving a soil residue that prevents the seeding of crops until the

following season. One way around this can be to focus applications on the lower areas of the field. Horsetail needs to be in constant contact with groundwater to survive, but may send rhizomes into upland areas of fields as well. Controlling the portion of the colony that is in contact with groundwater will also cut the source of water to the upland portion, causing it to expire as well.

The Agriculture and Agri-Food Canada research station at Scott did some testing of herbicides for in-crop control of horsetails in cereals and found that thifensulfuron/tribenuron (Refine SG and others) in a mix with MCPA provided the best results.

Cattails are very difficult to control and require high rates of either glyphosate or Amitrol 240. Because Amitrol is costly at high rates and is not bound strongly to soil, making it more of a problem near water, glyphosate is the preferable option. Remember that glyphosate is not for use directly in water and applications can only be made with a sprayer to within 10 metres of water. Plants closer to water may be treated with wipers or wicks.

Insect Update

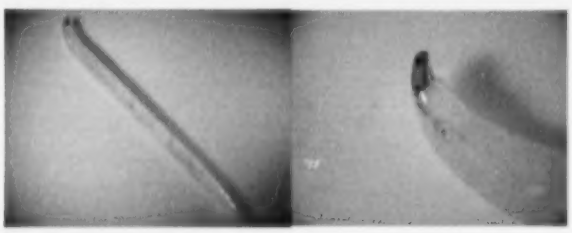
by Scott Hartley, PAg
Provincial Specialist, Insect and Vertebrate Pest Management

There have been no serious insect issues noted so far in 2013. There have been reports of the usual early season insect pests including wireworms, cutworms and flea beetles. There have also been several reports of other "worms", primarily in canola.

Frequently in the spring, the Crop Protection Laboratory receives samples of invertebrates of concern to producers that are not pests. Various insect larvae and enchytraeds are common submissions. Enchytraeds (below) are similar to earthworms, only much smaller (less than 20 mm). They have a similar life style in

Enchytraeds
Photo courtesy of Saskatchewan Agriculture archives.

recycling of soil detritus and are not harmful to the seed. Stiletto flies (below) are predaceous on other insects, including wireworm larvae, and so are also beneficial.



Stiletto fly larvae
Photo courtesy of Saskatchewan Agriculture archives.

Flea beetles have been reported by the Canola Council of Canada feeding on young canola seedlings. In 2012, flea beetle infestations were identified primarily in the northwestern and west-central regions of the province. Warm, dry weather is most favourable to the build-up of flea beetle populations; however, slow growing conditions can also factor in to the level of damage to canola crops. Some issues to keep in mind are:

- Seed treatments are most effective under dry, warm conditions.
- Flea beetles are more active with higher temperatures. Under cool conditions, the beetles will still feed

but not necessarily on the upper side of the cotyledons and early leaves. When monitoring for flea beetle damage, consider the undersides of leaves and especially the stems where serious damage can occur to young seedlings.

- Late-seeded crops under slow growing conditions will be more vulnerable, possibly for a longer period of time. Faster growing and more advanced crops can outgrow flea beetle damage.
- If 25 per cent of the cotyledons are damaged, an insecticide application may be warranted. Use only products registered for flea beetles in specified crops and follow label directions.

Cutworms have been reported in a few crops, including glassy cutworms in a commercial vegetable field. Species that over-winter in the larval stage, such as dingy cutworms, will be larger and start pupating earlier than the species over-wintering as eggs. Once most cutworms exceed 40 mm in length, they cease feeding and begin the pupation phase of their life cycle. Depending on temperature accumulation in an area, species that over-wintered in larval form can start pupation about mid-June. Species, such as red backed cutworms, that over-winter as eggs will not start pupation until the end of June to early July.

If cutworms are found, they can be submitted as part of cutworm research projects funded by the Canola Agronomic Research Program (CARP) to develop better identification tools for producers and acquire updated information on cutworm species and parasitism in the various species on the Prairies.

Various levels of **pea leaf weevil** damage were noted in southwestern Saskatchewan

Collecting cutworms for the cutworm survey and associated research projects

Your help is needed to source and collect cutworms.

- Larvae should be handled as little as possible and always gently.
- Include as many specimens as possible.
- Place larva plus feeding material into a **clean** container. (e.g. sour cream container) Alternatively, small paper bags can be used for collection and shipping cutworms IF the paper bag is protected from compaction (e.g. bubble wrap).
- Larvae require feeding material both for humidity and food so some leaves should be added to the container. Secure the container with tape to prevent it from opening during shipment. Use a box for shipping. Paper bags will work well for those who drop off samples.
- Do not include soil with the cutworm specimen as it damages the cutworm.

Every larva must have collection data, include the following: (1) collection date, (2) collector's name, (3) collector's email or phone number, (4) nearest town, (5) GPS or legal land description of field, (6) name of host crop/plant the worm was near or feeding on and (8) previous year's crop.

Shipping cutworms:

- In Saskatchewan, drop off samples at the nearest Regional Services Office or the Crop Protection Laboratory in Regina or use priority post to the Crop Protection Lab. If priority post is used, the submitter of the sample is responsible for mailing fees. If unsure of how to submit, contact Scott Hartley at 306-787-4669 or scott.hartley@gov.sk.ca.
- Mailing address:

  Crop Protection Laboratory
  346 MacDonald Street
  Regina SK S4N 6P6
  Phone: 306-787-8130

during the 2013 pea leaf weevil survey. Typical feeding notches were noted in a couple fields just north of the South Saskatchewan River in rural municipalities 228 and 259. Distribution of the weevil is continuing to affect fields further to the east. This year, significant infestations were observed in rural municipalities 76, 78, 109, 135, 141, 142, 166 and 167. Once peas reach the six-node stage, they will outgrow damage. In addition, by about this time the adult stage of the pea leaf weevil has ended and egg-laying is complete.

Wind currents over the past several weeks have brought **diamondback moths** to Saskatchewan. Adult moths started being found in traps in late May. Numbers remain low, however, with only seven of the 27 traps collecting moths. The Regina/Belle Plaine area has the highest totals to date, albeit fewer than 20 moths.

Bertha armyworm (BAW) traps were set up by co-operators in June. Bioclimatic models generated by Agriculture and Agri-Food Canada suggest that heat units have not reached levels required for BAW moth emergence. Trap data will be mapped weekly once emergence is reported. The peak period of BAW moth emergence tends to be about mid-July.

Scout Now for Sulphur Deficiencies

by Ken Panchuk, PAg
Provincial Specialist, Soils

Crop scouting is well underway so keep an eye open for yield-robbing sulphur deficiencies. Before scouting, check the field records and ask the following questions:

1) Was canola grown in this field in the last few years and was sulphur applied to that crop?
2) How much sulphur was applied for the current crop of canola?
3) What form of sulphur was applied?

A few sulphur facts to keep in mind are:

- Sulphur is needed for healthy growth from seedling emergence to the end of seed-filling. Running out of sulphur anytime during the growing season can result in reduced yields because sulphur is not translocated within plants like nitrogen and phosphorus.
- Plants can take up sulphur only in the sulphate form.
- Sulphur deficiencies usually occur in irregular patches within fields but can occur in entire fields as well, especially those with sandy soils.
- The biggest supply of sulphur comes from decomposing plant residue and soil organic matter. If you recently grew a crop of canola that had enough sulphur supplied to it, chances are that the decomposing canola residue will supply some of the needed plant-available sulphur.

Early symptoms of sulphur deficiency in canola. Note the upward cupping of a few leaves and the yellow botches.
Photo courtesy of IPNI.

Scout your canola and mustard fields looking for yellowing new leaves or leaves that are cupping upward with or without purpling on the underside of leaf margins. If symptoms of sulphur deficiency are found, plan for an application of ammonium

sulphate as soon as possible. Ammonium sulphate can be applied up to the early flower stage to rescue yield, but the earlier it is applied, the better the chance for yield recovery.

Advanced stage of sulphur deficiency. Note the severe cupping and purpling of the underside of leaves and the sandy soil.
Photo courtesy of the Canola Council of Canada.

If applying liquid sulphur (like 15-0-0-20), use split nozzles or drop tubes and be prepared for some leaf scorching.

The important thing is to ensure enough sulphur was applied to realize the full yield potential of the canola crop, because running out of sulphur during the seed-filling stage of a bumper crop will mean yield loss from small seeds and maybe even missing seeds and empty pods. Supplying a bit more sulphur than the canola crop needs will result in optimum yield and provide some residual-S for the subsequent crops in the rotation.

While crop scouting, keep an eye open for nitrogen deficiencies as well. Was enough nitrogen applied? Were nitrogen losses higher than normal? Have the growing conditions improved? Do you want to boost protein in bread wheat? Slightly pale green patches within a field may be the only symptom of nitrogen deficiency you will see. A handheld 'GreenSeeker' can help decide whether to top-dress additional nitrogen. Dribble-banding liquid nitrogen (28-0-0 or similar liquid products) using a split nozzle or drop tube may be the best strategy.

For more information on sulphur, refer to the Sulphur in Crop Production fact sheet.

Crop Protection Lab Update

by Cecilia Peluola, PAg, Supervisor, Crop Protection Laboratory

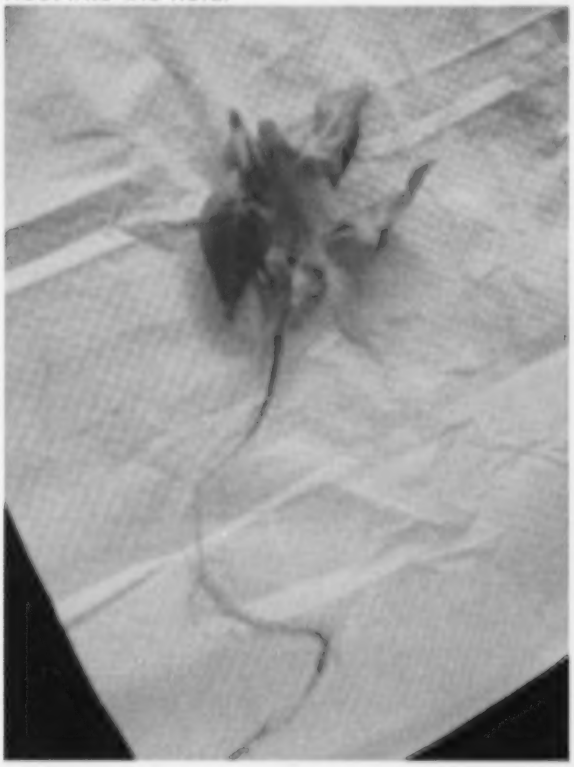
Over the last two weeks, the Crop Protection Lab has received the following submissions:

Disease/disorder:
A poplar sample was diagnosed with shoot and leaf blight caused by *Venturia populina* (shepherd's crook). Rhizoctonia root rot was diagnosed on lentil caused by *R. solani*. Snow mould and root rot were associated with a winter wheat sample.

A canola sample and a weed host at the roadside were diagnosed with Alternaria black spot disease. *Alternaria spp.* causes black spot disease of canola. All stages and parts above soil level can be affected.

Spring infection of Alternaria black spot on canola.
Photo courtesy of Saskatchewan Agriculture.

Spring infection of the disease occurs through seeds, infected crop residues or from alternative cruciferous weeds. In the case where weeds are the alternative host, the disease tends to be prevalent along road sides and low areas where the pathogen survives until the next cropping season on the weed. Infection of the crop decreases as you move away from weed host into the field.



Alternative weed host.
Photo courtesy of Saskatchewan Agriculture.

Downey mildew (*Peronospora trifoliorum*) and Crown and Root Rot disease caused by *Microdochium nivale*, *Typhula sp. and Fusarium sp.* were diagnosed from alfalfa in the past week.

Frost damage was diagnosed on a variety of crops. Herbicide damage – largely due to chemical drift – was also observed on a number of samples.

Weeds: Canada golden rod (*Solidago canadensis*), a weed of variable habitat, was submitted and identified.

The Crop Production News is a publication of the Crops and Irrigation Branch, Saskatchewan Ministry of Agriculture

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